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4 **Abstract**  
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6 This invention is a reactor and system with a method for containing and  
7 controlling a deuterium nuclear fusion reaction in a palladium host metal lattice, now  
8 generally referred to as 'solid state fusion'. The reactor is designed for high  
9 temperature operation at moderate deuterium gas pressures and is operable over a  
10 temperature range of 400°C to more than 1400°C. The solid state fusion reaction is  
11 enabled and controlled by providing specific combinations of reactor temperatures  
12 and deuterium gas pressures. The invention is capable of generating heat densities  
13 that are suitable for commercial applications. The highest heat densities are  
14 produced at higher temperatures and moderate pressures where the system is most  
15 efficient and cost effective.  
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